OIPE JC56
JUN 28 2004
PATENT & TRADEMARK OFFICE

FIG. 1

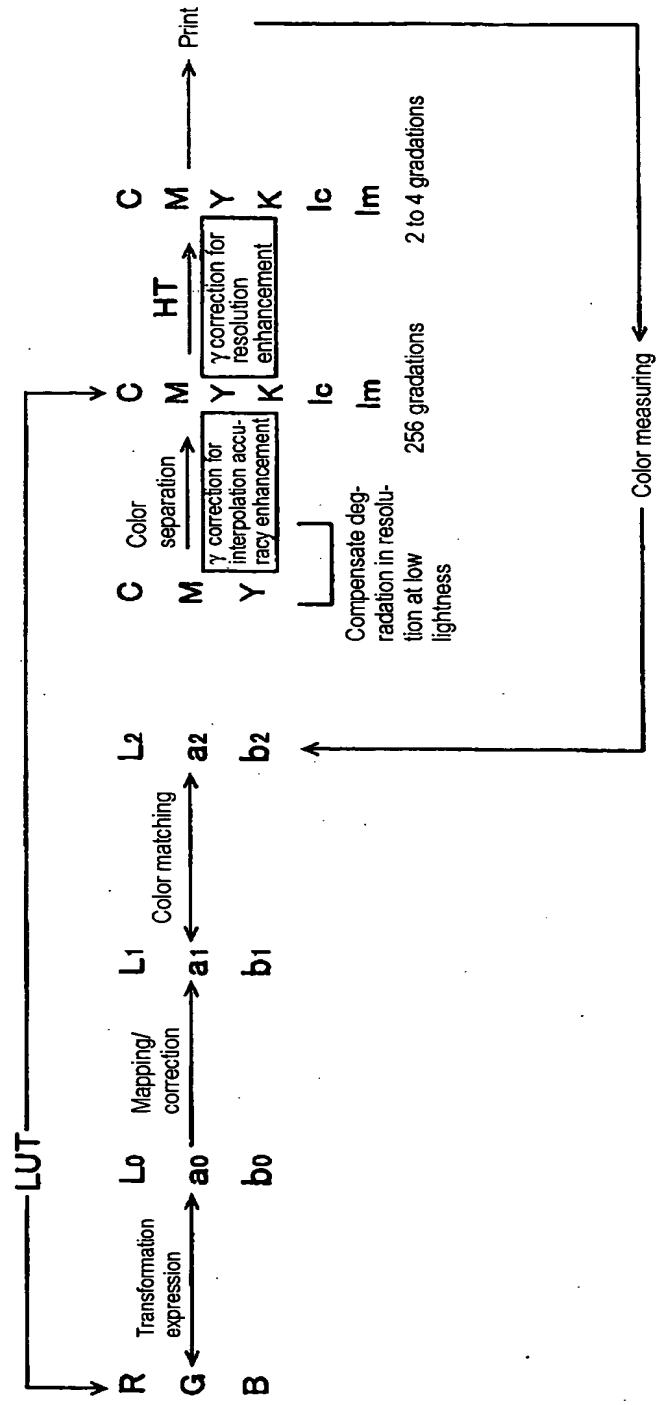


FIG. 2

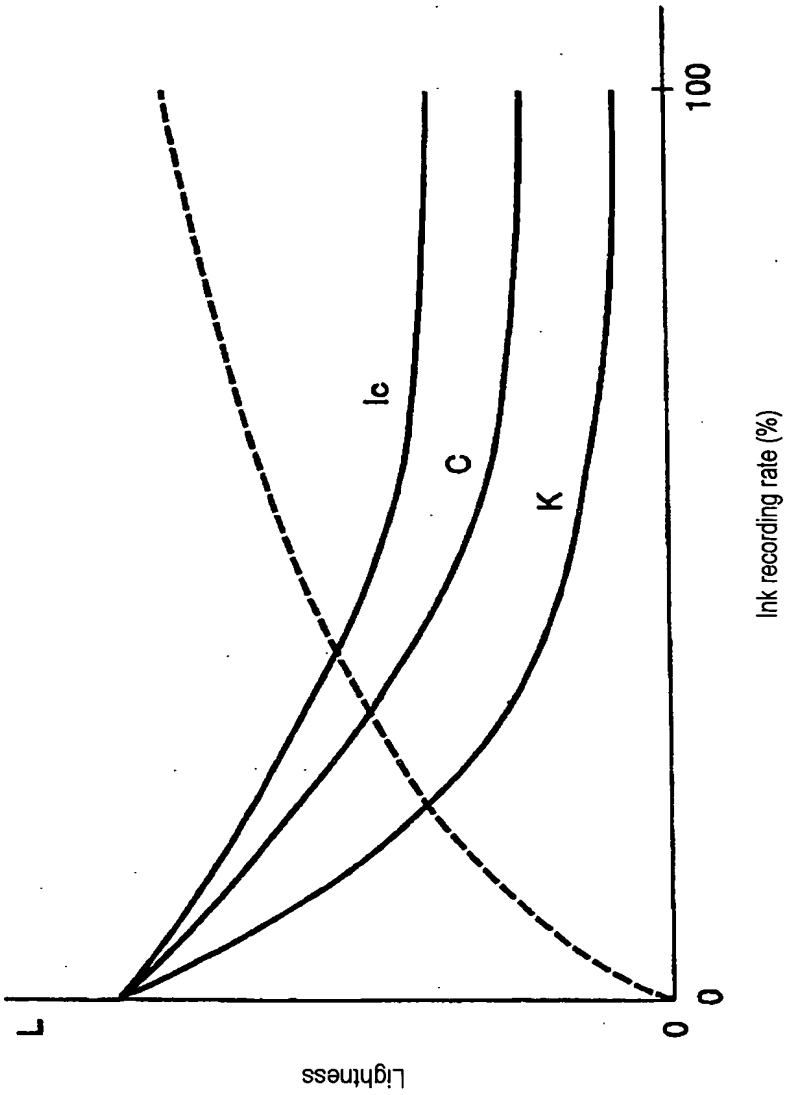


FIG. 3

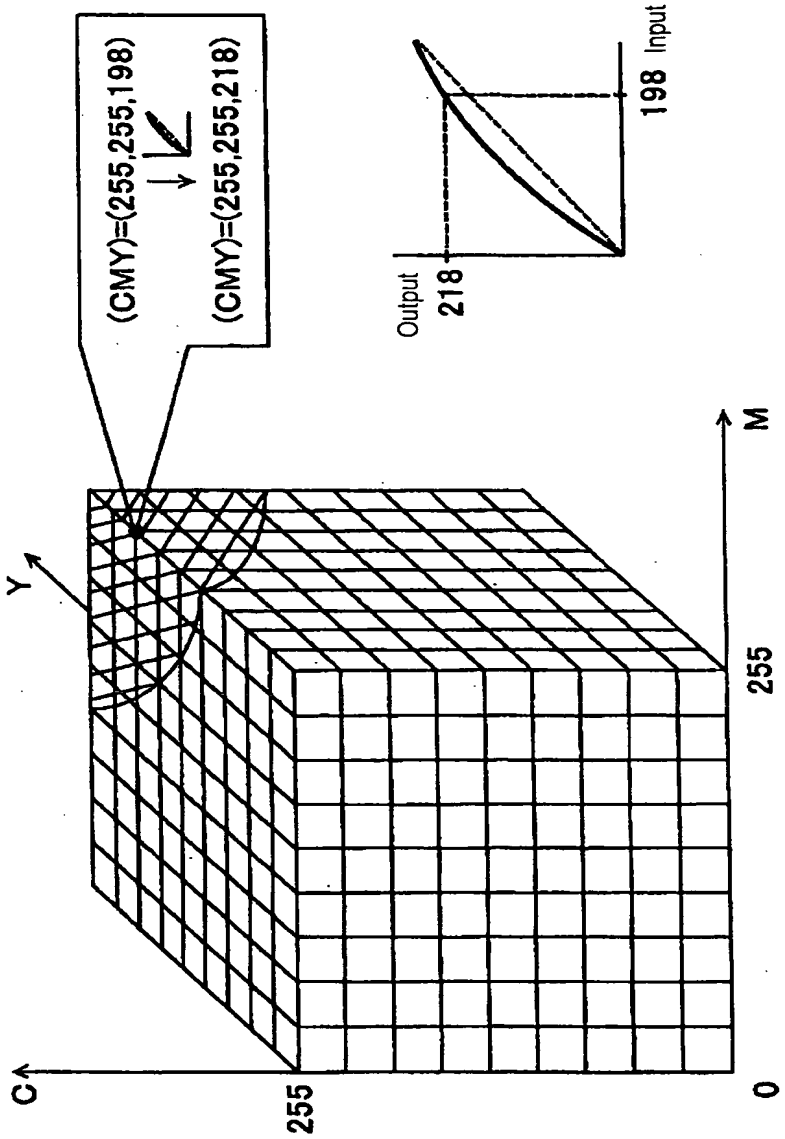

(CMY)=(255,255,198)
(CMY)=(255,255,218)
Output
218
198
Input
Y
M
C
255
255
0

FIG. 4

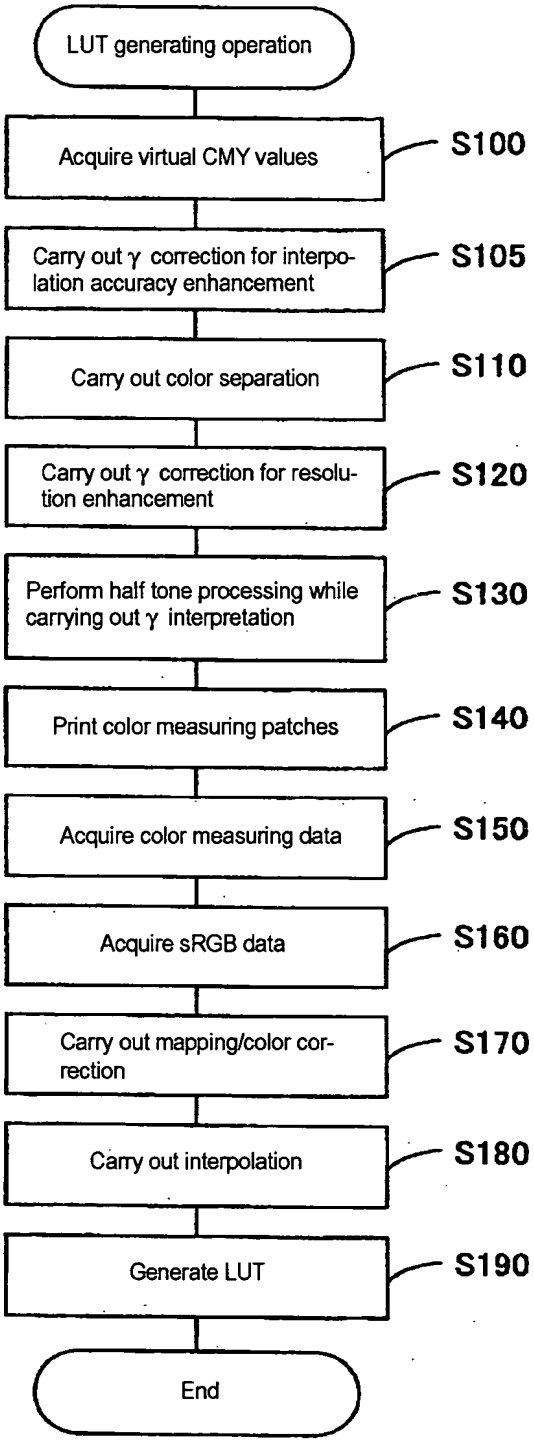

LUT generating operation
Acquire virtual CMY values
S100
Carry out γ correction for interpolation accuracy enhancement
S105
Carry out color separation
S110
Carry out γ correction for resolution enhancement
S120
Perform half tone processing while carrying out γ interpretation
S130
Print color measuring patches
S140
Acquire color measuring data
S150
Acquire sRGB data
S160
Carry out mapping/color correction
S170
Carry out interpolation
S180
Generate LUT
S190
End

FIG. 5

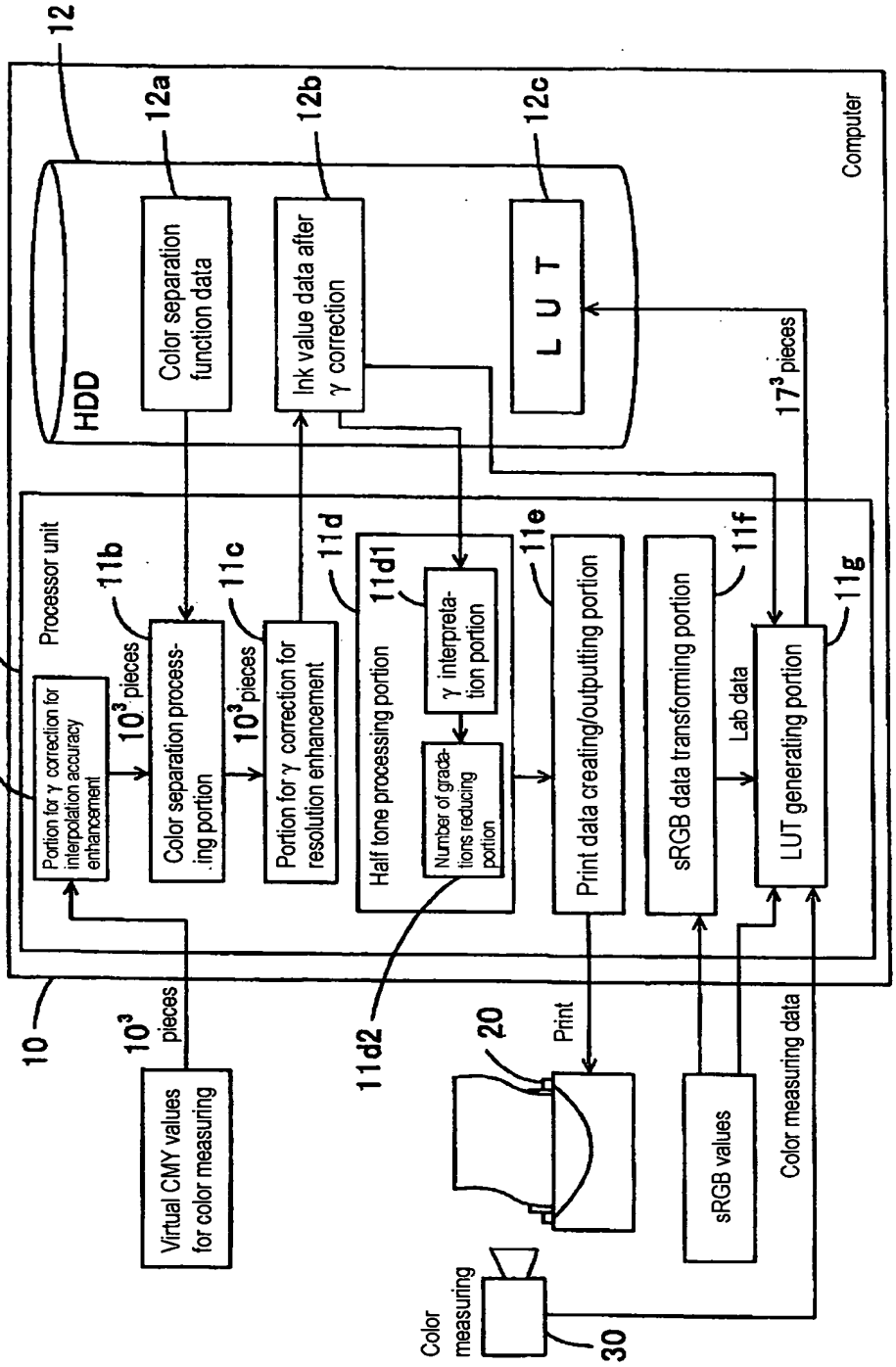

12
12a
12b
12c
Computer
HDD
Color separation function data
Ink value data after γ correction
LUT
17³ pieces
Processor unit
11
11a
11b
11c
11d
11d1
11e
11f
11g
Portion for γ correction for interpolation accuracy enhancement
10³ pieces
Color separation process-ing portion
10³ pieces
Portion for γ correction for resolution enhancement
Half tone processing portion
γ interpreta-tion portion
Number of grada-tions reducing portion
Print data creating/outputting portion
sRGB data transforming portion
Lab data
LUT generating portion
10
10³ pieces
11d2
20
Print
Virtual CMY values for color measuring
sRGB values
Color measuring data
Color measuring
30

FIG. 6

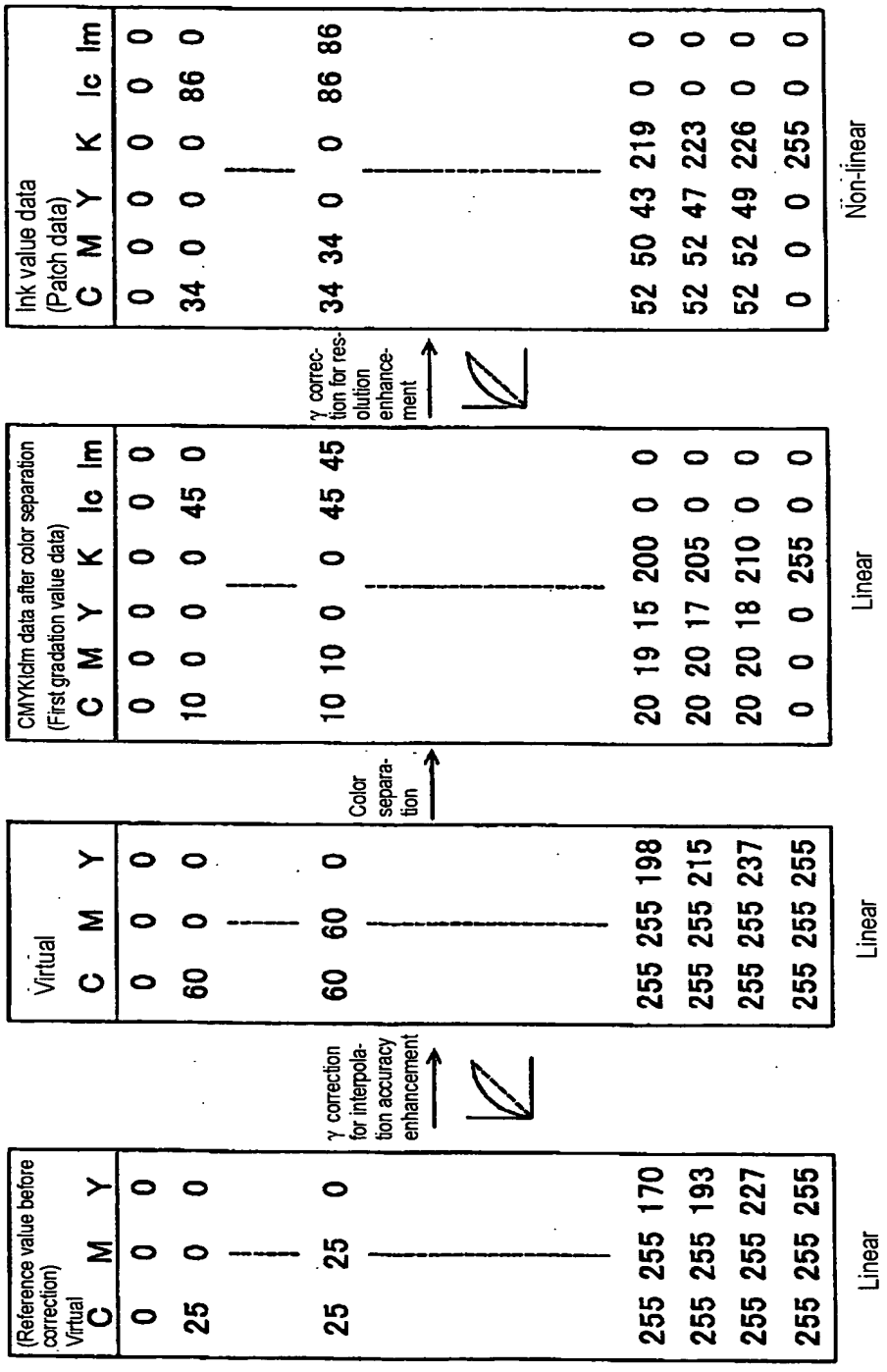

(Reference value before correction)
Virtual
C M Y
0 0 0
25 0 0
25 25 0
255 255 170
255 255 193
255 255 227
255 255 255
Linear
γ correction for interpolation accuracy enhancement
Virtual
C M Y
0 0 0
60 0 0
60 60 0
255 255 198
255 255 215
255 255 237
255 255 255
Linear
Color separation
CMYKlclm data after color separation
(First gradation value data)
C M Y K lc lm
0 0 0 0 0 0
10 0 0 0 45 0
10 10 0 0 45 45
20 19 15 200 0 0
20 20 17 205 0 0
20 20 18 210 0 0
0 0 0 255 0 0
Linear
γ correction for resolution enhancement
Ink value data
(Patch data)
C M Y K lc lm
0 0 0 0 0 0
34 0 0 0 86 0
34 34 0 0 86 86
52 50 43 219 0 0
52 52 47 223 0 0
52 52 49 226 0 0
0 0 0 255 0 0
Non-linear

FIG. 7

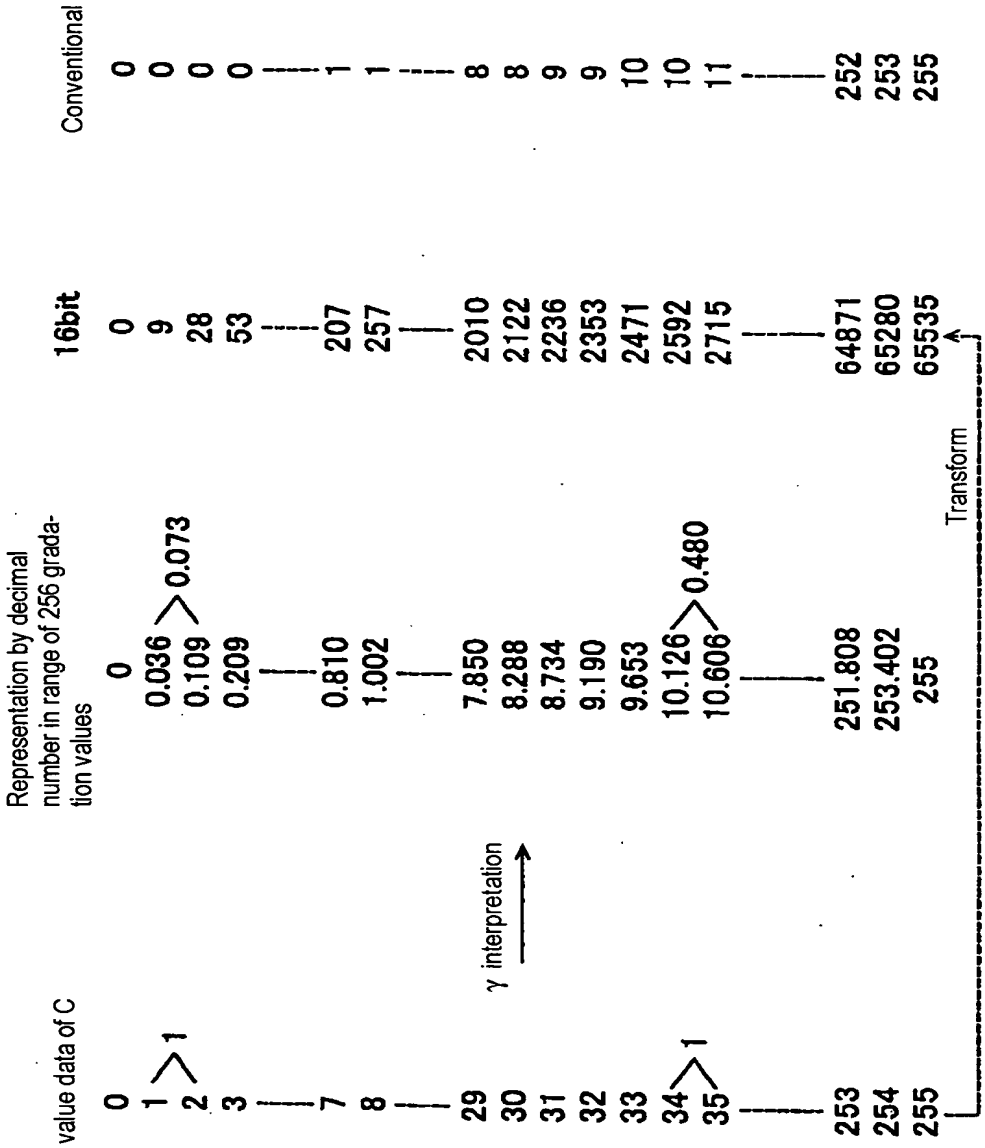

Ink value data of C
Representation by decimal number in range of 256 gradation values
γ interpretation
16bit
Conventional
Transform
0
1
2
3
7
8
29
30
31
32
33
34
35
253
254
255
0
0.036
0.109
0.209
0.810
1.002
7.850
8.288
8.734
9.190
9.653
10.126
10.606
251.808
253.402
255
0.073
0.480
0
9
28
53
207
257
2010
2122
2236
2353
2471
2592
2715
64871
65280
65535
0
0
0
0
1
1
8
8
9
9
10
10
11
252
253
255

FIG. 8

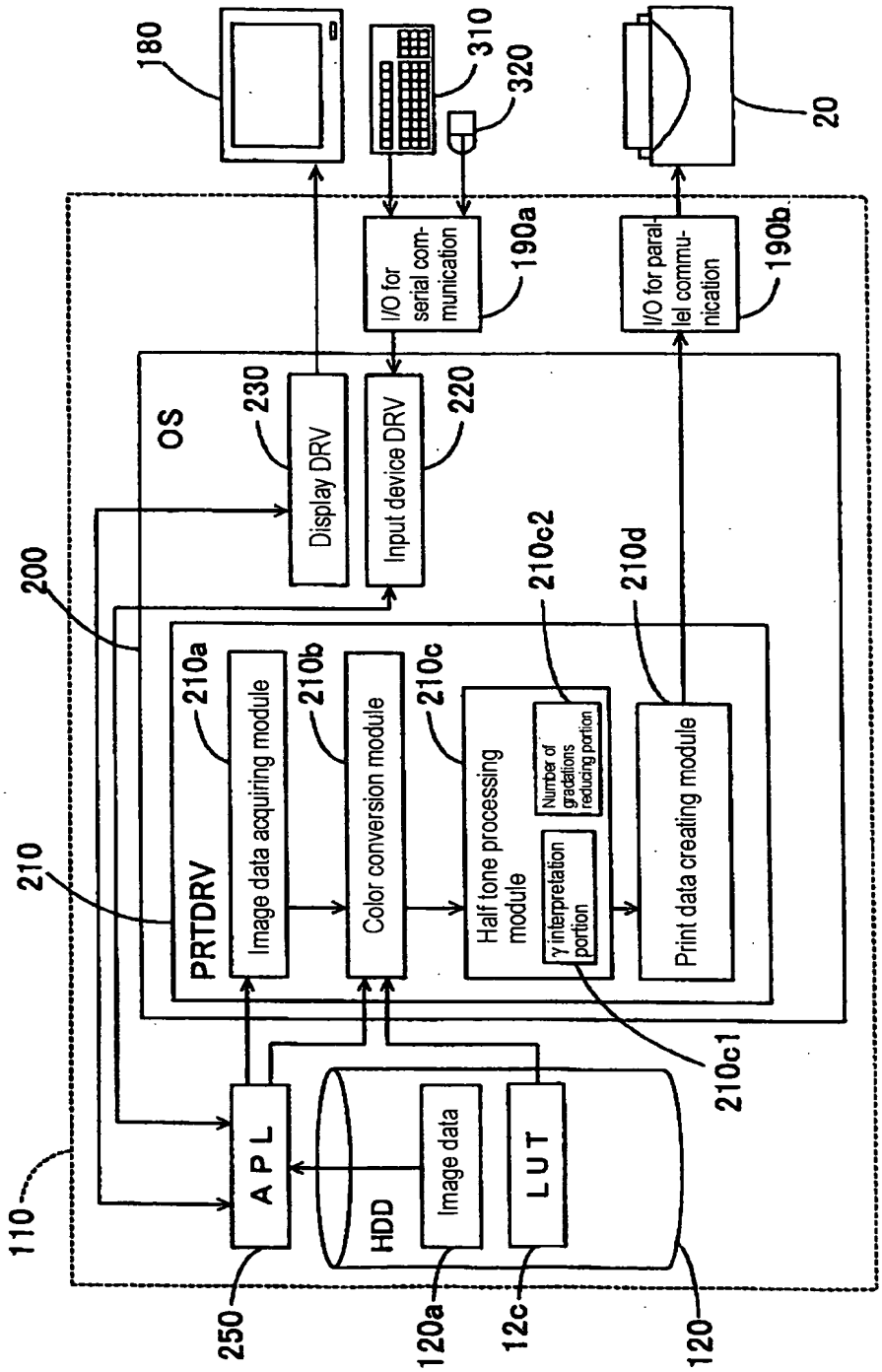

180
310
320
20
I/O for serial communication
190a
I/O for parallel communication
190b
OS
230
Display DRV
220
Input device DRV
200
210c2
210d
210a
210b
210c
PRTDRV
Image data acquiring module
Color conversion module
Half tone processing module
Number of gradations reducing portion
γ interpretation portion
Print data creating module
210
210c1
110
APL
HDD
Image data
LUT
250
120a
12c
120

FIG. 9

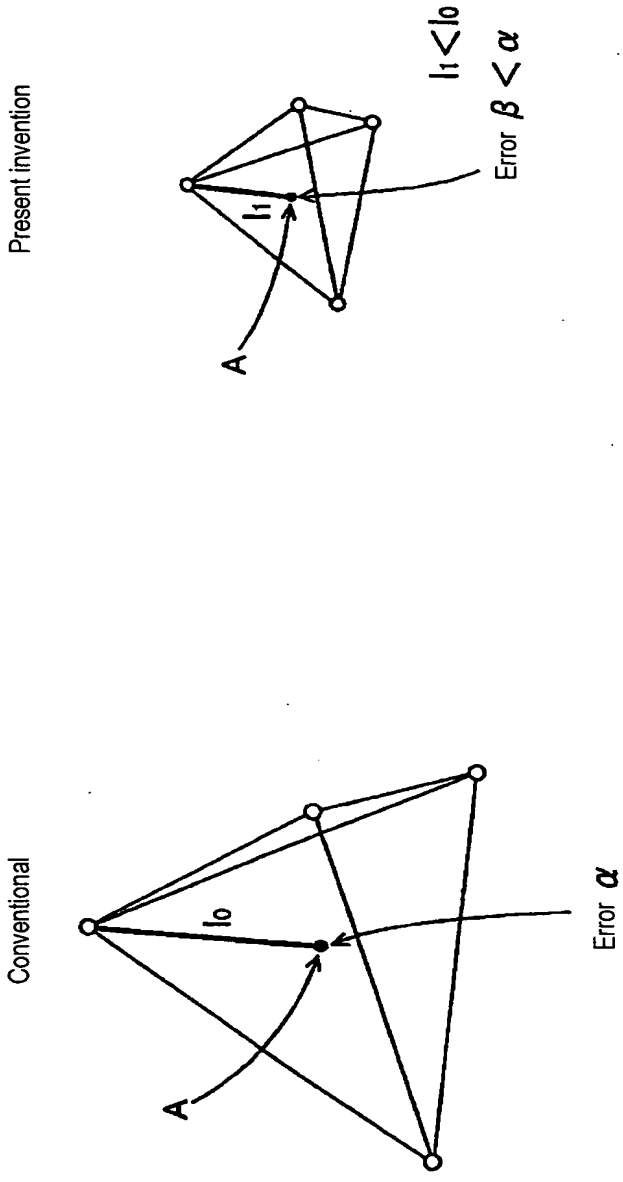

Present invention
$l_1 < l_0$
Error $\beta < \alpha$
l_1
A
Conventional
l_0
Error α
A

FIG. 10

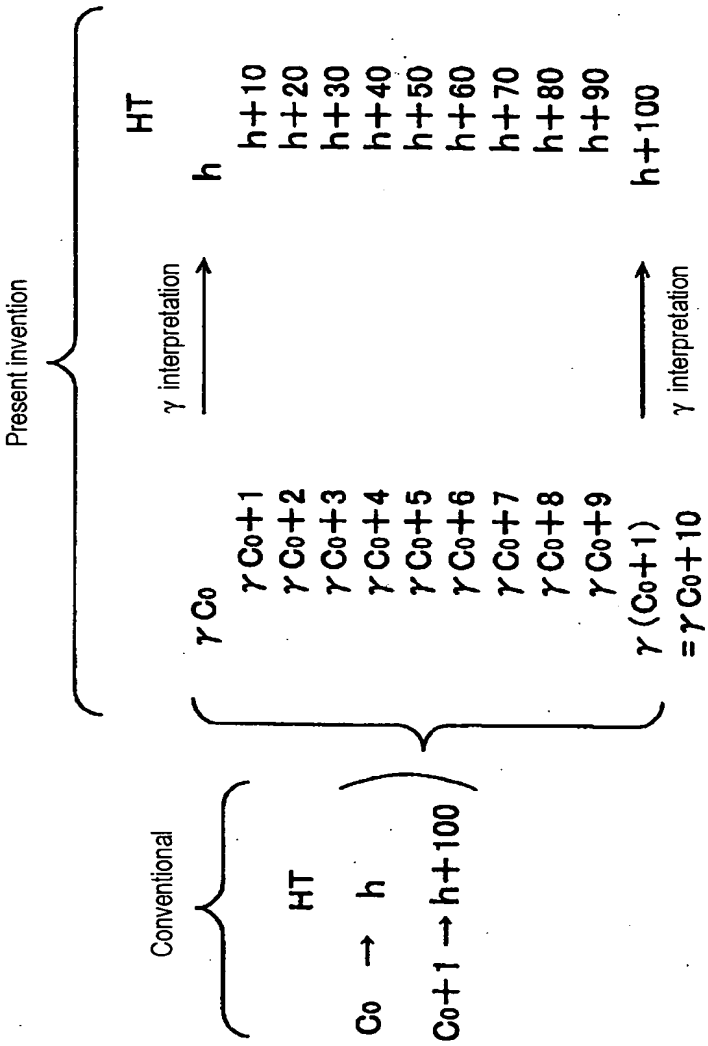

Present invention
HT
h
h+10
h+20
h+30
h+40
h+50
h+60
h+70
h+80
h+90
h+100
γ interpretation
γ interpretation
γ C0
γ C0+1
γ C0+2
γ C0+3
γ C0+4
γ C0+5
γ C0+6
γ C0+7
γ C0+8
γ C0+9
γ (C0+1)
= γ C0+10
Conventional
HT
C0 → h
C0+1 → h+100

FIG. 11

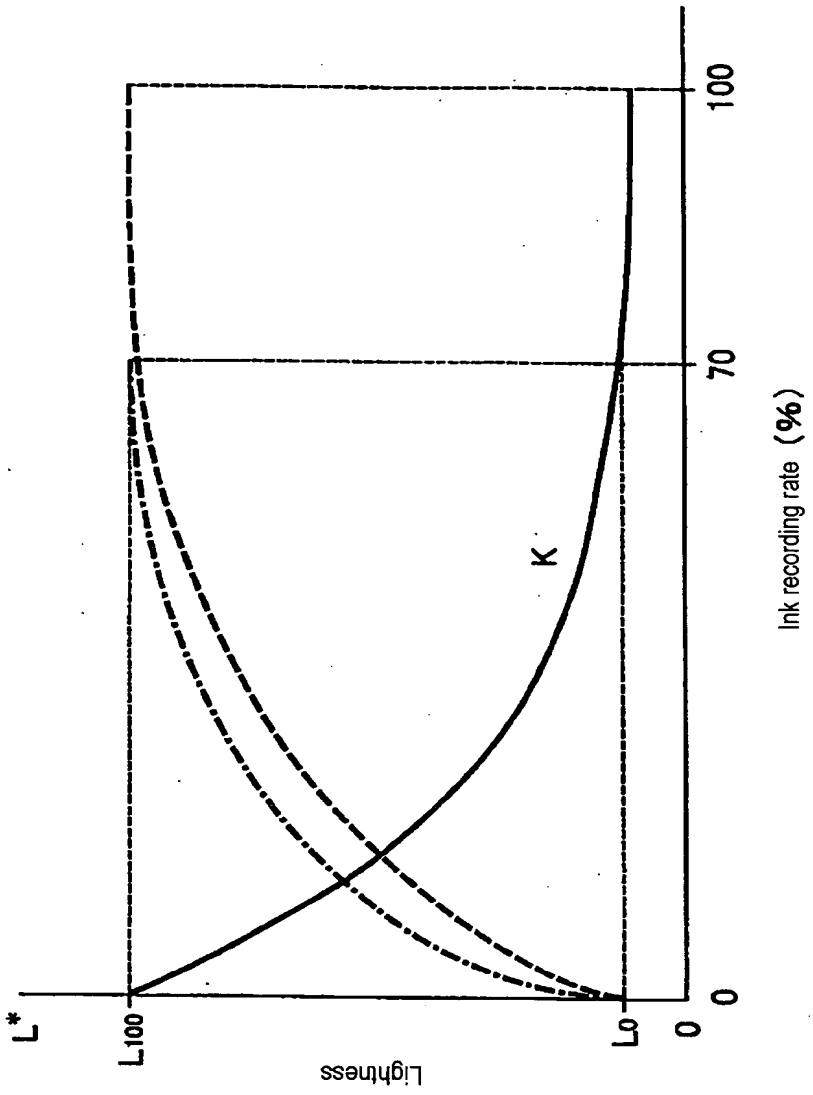


FIG. 12

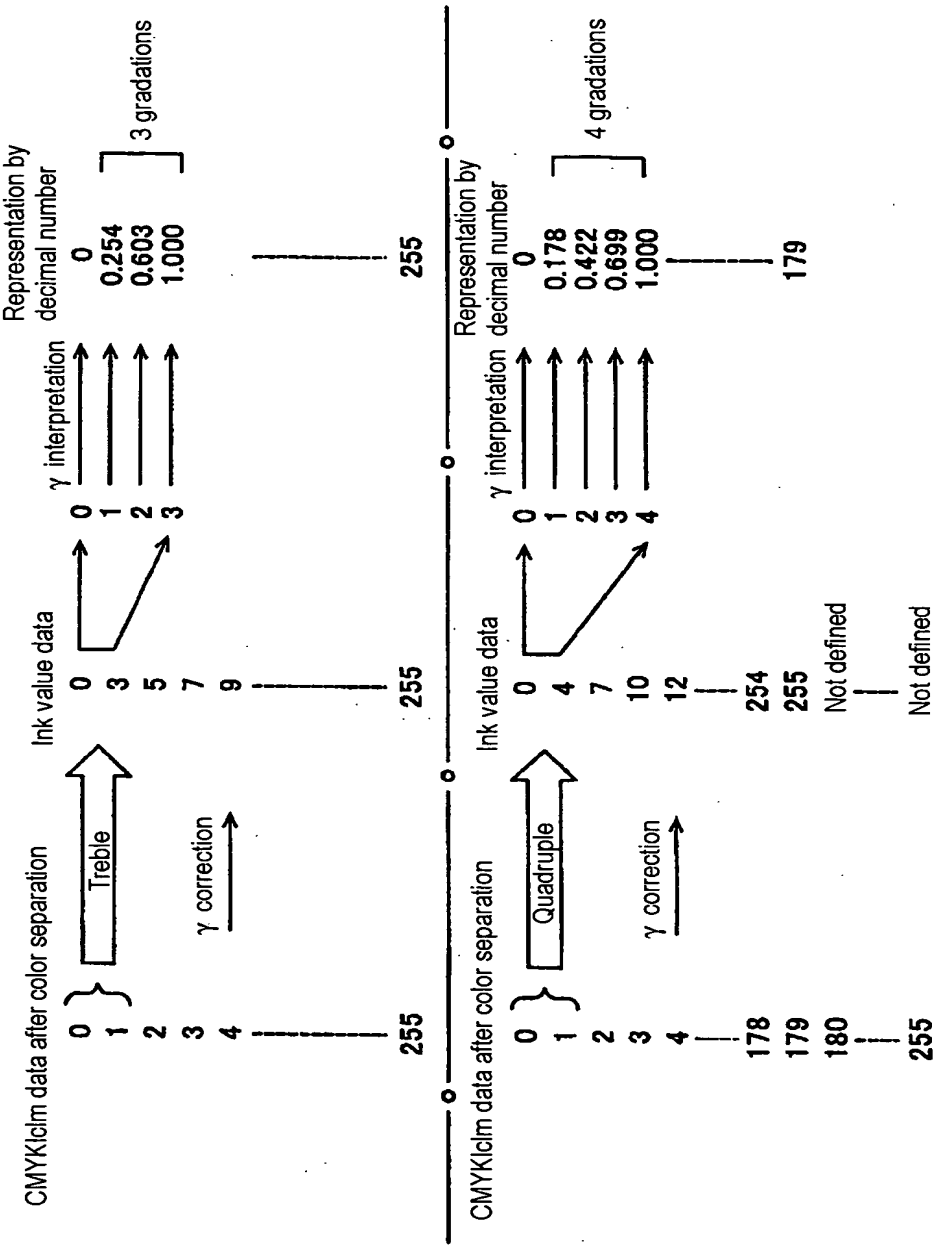

CMYKlclm data after color separation
Treble
Ink value data
γ interpretation
Representation by decimal number
3 gradations
γ correction
Quadruple
4 gradations
0
1
2
3
4
178
179
180
255
0
3
5
7
9
255
0.254
0.603
1.000
0
4
7
10
12
254
255
Not defined
0.178
0.422
0.699
1.000
179

FIG. 13

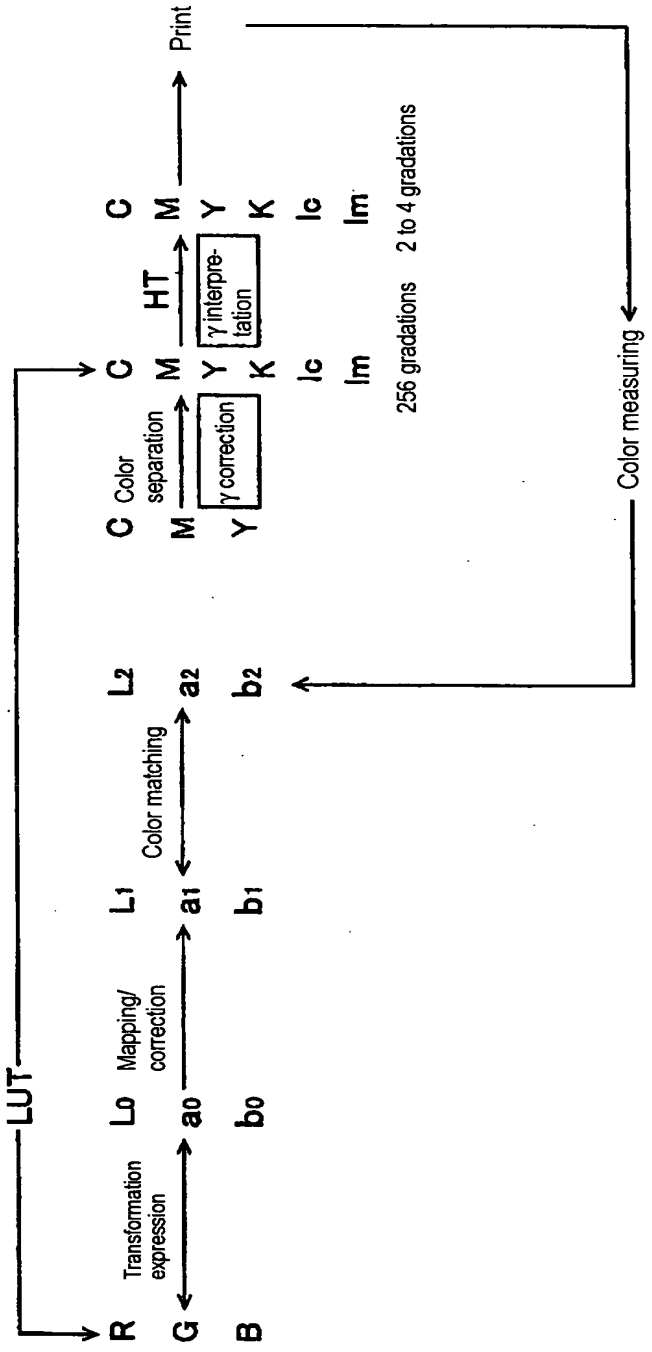

LUT
R
G
B
Transformation expression
L0
a0
b0
Mapping/ correction
L1
a1
b1
Color matching
L2
a2
b2
C
M
Y
Color separation
γ correction
HT
γ interpre-tation
K
Ic
Im
256 gradations
2 to 4 gradations
Print
Color measuring

FIG. 14

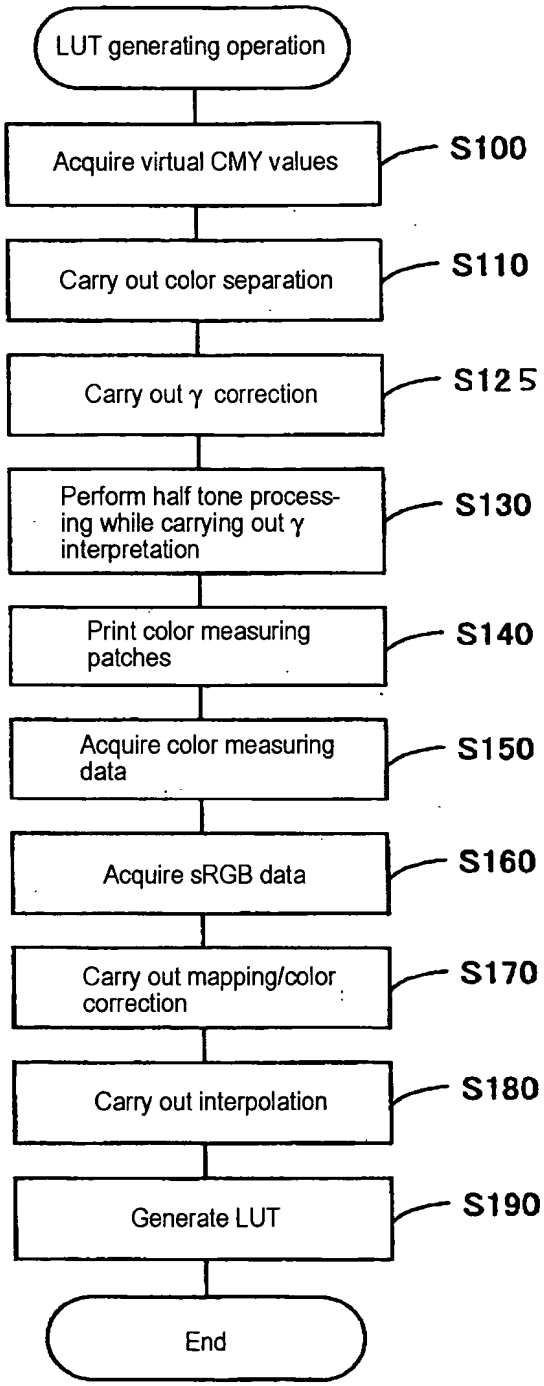

LUT generating operation
Acquire virtual CMY values
S100
Carry out color separation
S110
Carry out γ correction
S125
Perform half tone processing while carrying out γ interpretation
S130
Print color measuring patches
S140
Acquire color measuring data
S150
Acquire sRGB data
S160
Carry out mapping/color correction
S170
Carry out interpolation
S180
Generate LUT
S190
End

FIG. 15

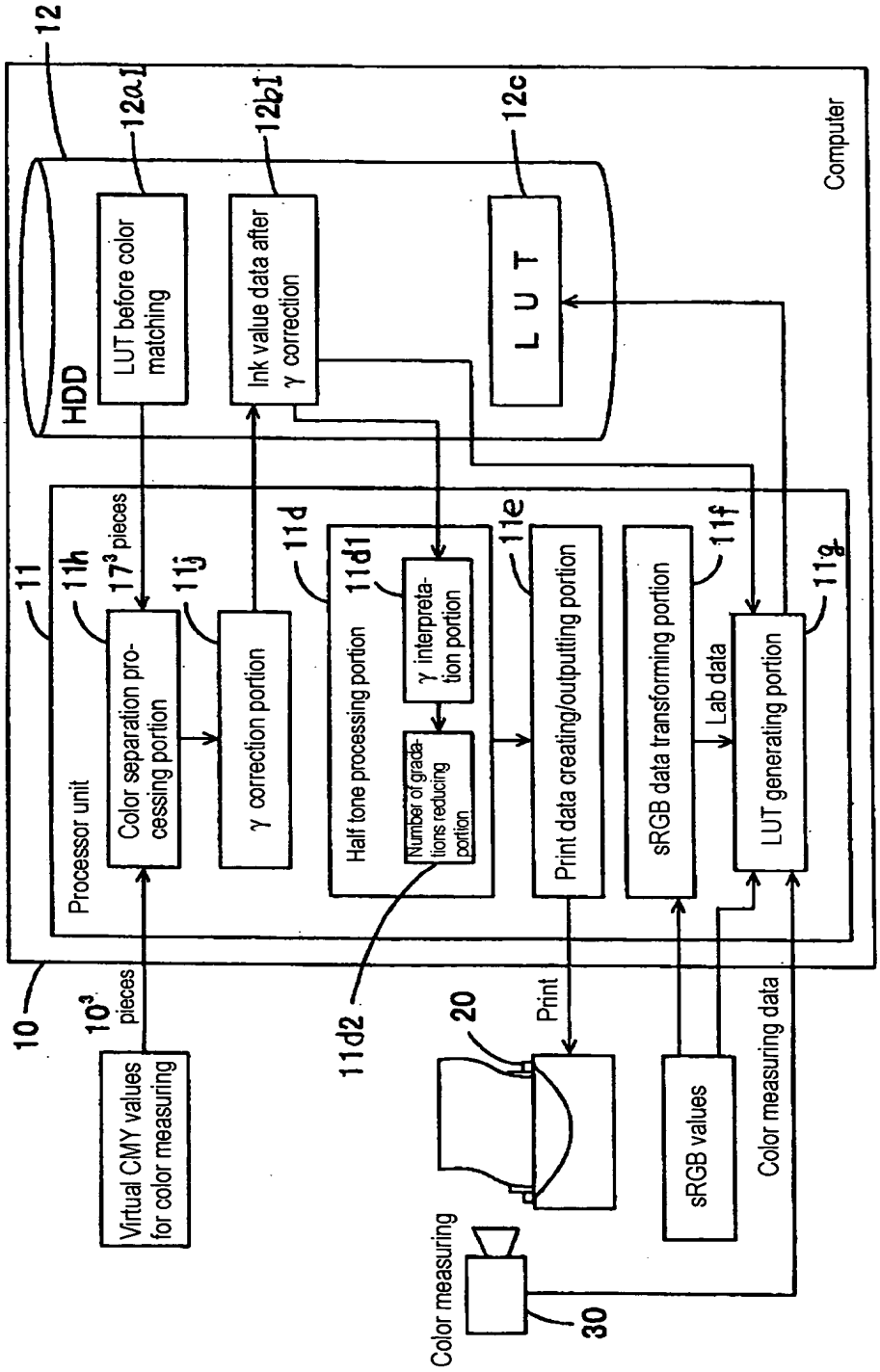

12
12a1
12b1
12c
Computer
HDD
LUT before color matching
Ink value data after γ correction
L U T
11
11h
17^3 pieces
11j
11d
11d1
11e
11f
11g
Processor unit
Color separation processing portion
γ correction portion
Half tone processing portion
γ interpretation portion
Number of gradations reducing portion
Print data creating/outputting portion
sRGB data transforming portion
Lab data
LUT generating portion
10
10^3 pieces
Virtual CMY values for color measuring
11d2
20
Print
sRGB values
Color measuring data
Color measuring
30

FIG. 16

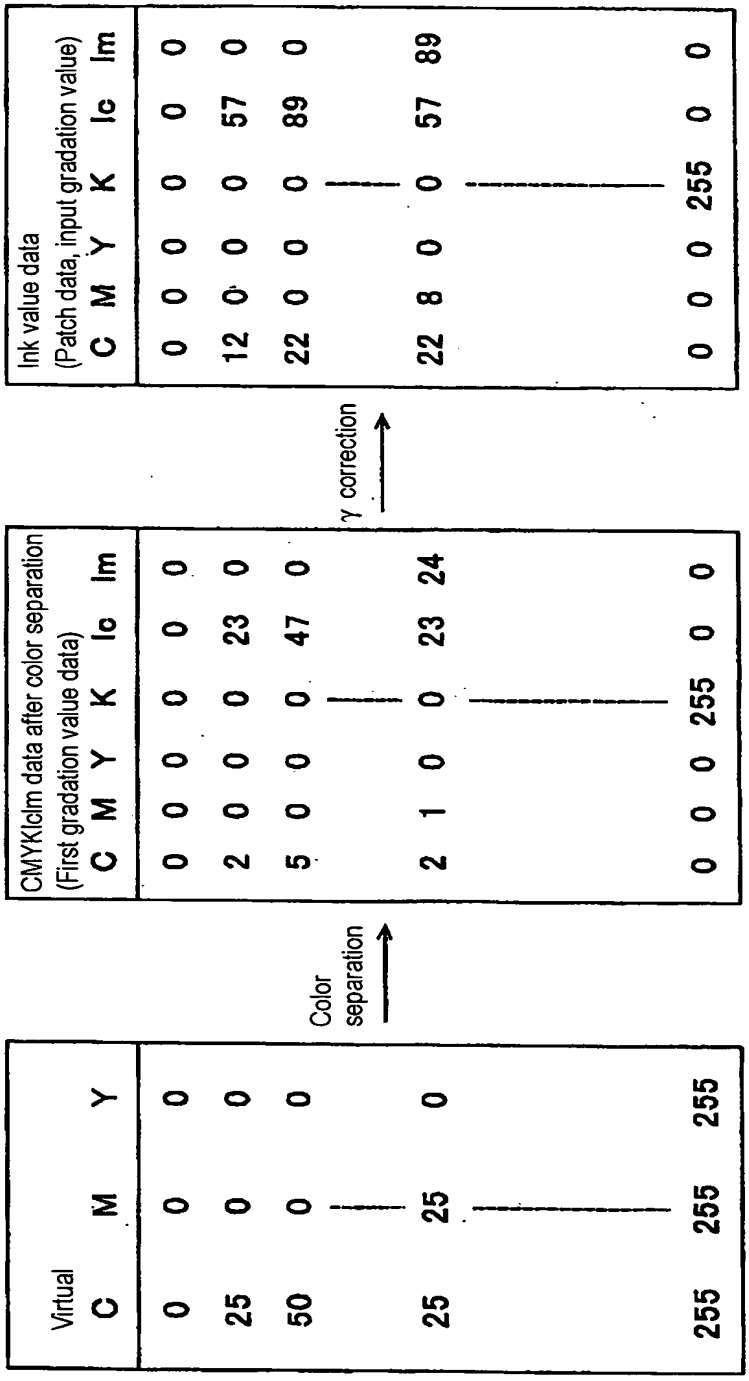
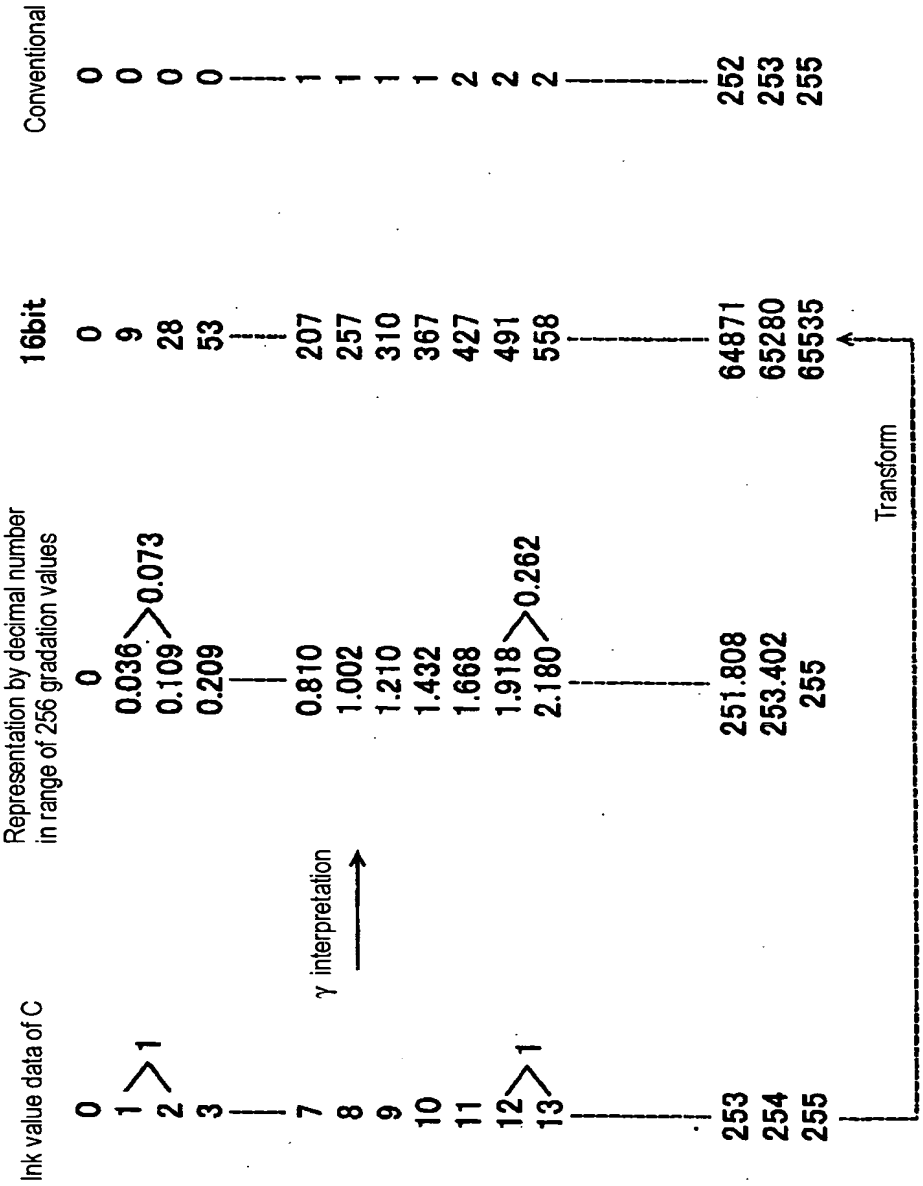

Virtual
C M Y
0 0 0
25 0 0
50 0 0
25 25 0
255 255 255
Color separation
CMYKlclm data after color separation
(First gradation value data)
C M Y K lc lm
0 0 0 0 0 0
2 0 0 0 23 0
5 0 0 0 47 0
2 1 0 0 23 24
0 0 0 255 0 0
γ correction
Ink value data
(Patch data, input gradation value)
C M Y K lc lm
0 0 0 0 0 0
12 0 0 0 57 0
22 0 0 0 89 0
22 8 0 0 57 89
0 0 0 255 0 0

FIG. 17


Ink value data of C
Representation by decimal number in range of 256 gradation values
16bit
Conventional
γ interpretation
Transform
0
1
2
3
7
8
9
10
11
12
13
253
254
255
0
0.036
0.109
0.209
0.810
1.002
1.210
1.432
1.668
1.918
2.180
251.808
253.402
255
0.073
0.262
0
9
28
53
207
257
310
367
427
491
558
64871
65280
65535
0
0
0
0
1
1
1
1
2
2
2
252
253
255